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#36 - 7691 Moffatt Road, Richmond, British Columbia
V6Y 1X9 (CA). **YANG, Quanzu** [CA/CA]; 304 - 2715
Osoyoos Crescent, Vancouver, British Columbia V6B 1G1
(CA).

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(74) Agents: **OYEN, Gerald, O., S.** et al.; Oyen Wiggs Green
& Mutala, #480 - The Station, 601 West Cordova Street,
Vancouver, British Columbia V6B 1G1 (CA).

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(71) Applicant (*for all designated States except US*): **THE
UNIVERSITY OF BRITISH COLUMBIA** [CA/CA];
Industry Liaison Office, 103 - 6190 Agronomy Road,
Vancouver, British Columbia V6T 1Z3 (CA).

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(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **TROCZYNSKI**,
Tomasz [CA/CA]; 1050 East 57th Avenue, Vancouver,
British Columbia V5X 1T6 (CA). **HAKIMI**, Dorna
[IR/CA]; 3335 - 6335 Thunderbird Crescent, Mail Box
#200, Vancouver, British Columbia V6T 2G9 (CA). **HYUN**,
Buhsung [KR/CA]; 116 - 2263 Redbud Lane,
Vancouver, British Columbia V6K 4V7 (CA). **KESH-
MIRI**, Mehrdad [CA/CA]; 9855 Still Creek Avenue,
Burnaby, British Columbia V3J 1C9 (CA). **LIEN**,
Mao-Jung, Maurice [CA/CA]; 23017 - 122A Avenue,
Maple Ridge, British Columbia V2X 0X3 (CA). **RAJTAR**,
Arc [AU/CA]; 53 - 2979 Panorama Drive, Coquitlam,
British Columbia V3E 2W8 (CA). **SMITH**, Douglas
[CA/CA]; 2956 Victoria Drive, Vancouver, British Colum-
bia V5N 4L8 (CA). **TSUI**, Pui, Hung, Manus [CA/CA];

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ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: **CALCIUM PHOSPHATE COATED IMPLANTABLE MEDICAL DEVICES AND PROCESSES FOR MAKING
SAME**

(57) Abstract: This invention relates to calcium phosphate-coated implantable medical devices and processes of making same. The calcium-phosphate coatings are designed to minimize the immune response to the implant (e.g. restenosis in stenting procedures) and can be used to store and release a medicinally active agent in a controlled manner. Such coatings can be applied to any implantable medical devices and are useful for a number of medical procedures including (but not limited to) balloon angioplasty in cardiovascular stenting, ureteral stenting and catheterisation. The calcium phosphate coatings can be applied to a substrate as one or more coatings by a sol-gel deposition process, an aerosol-gel deposition process, a biomimetic deposition process, a calcium phosphate cement deposition process, an electro-phoretic deposition process or an electrochemical deposition process. The coating can contain and elude a drug in an engineered manner.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61L27/32 A61L31/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, EMBASE, BIOSIS, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,Y	US 6 113 993 A (GAO YUFEI ET AL) 5 September 2000 (2000-09-05) claims 1-3,10,11,15 column 2, lines 25-27	1-15
X,Y	US 6 139 585 A (LI PANJIAN) 31 October 2000 (2000-10-31) claims 1,2,6,7 column 3, lines 47-51 column 4, lines 51-56	1-15

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Peris Antoli, B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA 03/01405

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-26

Process for coating an implantable medical device with a calcium phosphate coating comprising:

- (a) hydrolysing a phosphor precursor in water or alcohol based medium;
- (b) adding a calcium salt precursor to the medium to obtain a calcium phosphate gel;
- (c) depositing the gel on the surface of a substrate;
- (d) calcining the coating at a suitable elevated temperature. [Claims 16-26]

Implantable medical devices coated with a calcium phosphate coating. [Claims 1-15].

2. claims: 27-36 (partially); 1-15

Process for coating a (soft tissue) implantable device with a calcium phosphate coating utilizing a biomimetic deposition process. [Claims 27-36 (partially)]

Implantable medical devices coated with a calcium phosphate coating. [Claims 1-15].

3. claims: 27-36 (partially); 1-15

Process for coating a (soft tissue) implantable device with a calcium phosphate coating utilizing a calcium phosphate cement deposition process. [Claims 27-36 (partially)]

Implantable medical devices coated with a calcium phosphate coating. [Claims 1-15].

4. claims: 27-36 (partially); 1-15

Process for coating a (soft tissue) implantable device with a calcium phosphate coating utilizing an electrophoretic deposition process. [Claims 27-36 (partially)]

Implantable medical devices coated with a calcium phosphate coating. [Claims 1-15].

5. claims: 27-36 (partially); 1-15

Process for coating a (soft tissue) implantable device with a calcium phosphate coating utilizing an electrochemical deposition process. [Claims 27-36 (partially)]

Implantable medical devices coated with a calcium phosphate coating. [Claims 1-15].

INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/01405

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,Y	<p>ISHIZAWA H ET AL: "CHARACTERIZATION OF THIN HYDROXYPATITE LAYERS FORMED ON ANODIC TITANIUM OXIDE FILMS CONTAINING CA AND P BY HYDROTHERMAL TREATMENT"</p> <p>JOURNAL OF BIOMEDICAL MATERIALS RESEARCH, WILEY, NEW YORK, NY, US, vol. 29, September 1995 (1995-09), pages 1071-1079, XP001079319</p> <p>ISSN: 0021-9304</p> <p>abstract</p>	1-15
X,Y	<p>US 5 205 921 A (SHIRKANZADEH MORTEZA)</p> <p>27 April 1993 (1993-04-27)</p> <p>claims 1-4,14</p> <p>column 3, lines 31-40</p> <p>examples 1-5</p>	1-15
X,Y	<p>LIU D-M ET AL: "Water-based sol-gel synthesis of hydroxyapatite: process development"</p> <p>BIOMATERIALS, ELSEVIER SCIENCE PUBLISHERS BV., BARKING, GB, vol. 22, no. 13, July 2001 (2001-07), pages 1721-1730, XP004245930</p> <p>ISSN: 0142-9612</p> <p>abstract</p>	1-26
X,Y	<p>LIU D-M ET AL: "Sol-gel hydroxyapatite coatings on stainless steel substrates"</p> <p>BIOMATERIALS, ELSEVIER SCIENCE PUBLISHERS BV., BARKING, GB, vol. 23, no. 3, February 2002 (2002-02), pages 691-698, XP004348079</p> <p>ISSN: 0142-9612</p> <p>abstract</p> <p>page 692, column 1, paragraph 3</p> <p>page 696, column 2, paragraph 3 - page 697, column 1, paragraph 1</p>	1-26
X,Y	<p>LIU D-M ET AL: "Aging effect on the phase evolution of water-based sol-gel hydroxyapatite"</p> <p>BIOMATERIALS, ELSEVIER SCIENCE PUBLISHERS BV., BARKING, GB, vol. 23, no. 4, 15 February 2002 (2002-02-15), pages 1227-1236, XP004348142</p> <p>ISSN: 0142-9612</p> <p>abstract</p> <p>page 1228, column 1, lines 34-49</p> <p>page 1235, column 1, paragraph 2</p>	1-26

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/01405

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 849 569 A (DAVIES JOHN E) 15 December 1998 (1998-12-15) column 3, line 61 - column 4, line 14 column 5, lines 15-61 column 10, line 60 - column 11, line 9 -----	16-26
Y	US 6 312 472 B1 (HALL JAN ET AL) 6 November 2001 (2001-11-06) column 3, lines 15-19,33-45 column 5, lines 15-30 -----	1-8,13, 14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP03/01405

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